



# Ants on a Twig

*Ant communication and team work—a great model!*

## Objectives

Students will (1) identify similarities and differences between the basic needs of ants and humans, and (2) investigate ant behaviors and their purpose in survival.

## Background

Ants are members of a family of insects known for their highly organized social life. Over 11,000 known species exist. While most ants live in the tropics, species can be found throughout the world, on every continent except Antarctica. Ants are important to the environment. They contribute to population control of their prey, recycle plant material, aid in seed dispersal, and turn the soil.

All ants are social, living in groups that range in size from a few individuals to colonies with half a million or more members. Ant colonies, or armies, have two classes of individuals: reproductive and non-reproductive. All ants, whether reproductive or non-reproductive, go through a four-stage life cycle—egg, larva, pupa, and adult. The queen and the male ants are reproductive. They have wings and can fly, although queens lose their wings when they begin a colony. As in other related insects such as bees and wasps, males arise from unfertilized eggs; fertilized eggs develop into females, most of which are workers. The largest workers are usually soldiers, and they may be equipped with oversized, muscular heads and sword-like jaws. Medium-sized workers forage for food, and the smallest workers are nurse ants that tend the young.

Ants are closely related to wasps and have a similar body structure. The ant's antennae are typically jointed in the middle. Some species of ants are able to sting for defense, while other species secrete formic acid, a potent repellent. The jaws of worker ants are used for tasks such as creating defense, building nests, and caring for larvae.

**Grade Level:**  
Lower Elementary

**Content Areas:**  
Science, Expressive Arts,  
Environmental Education

**Method:** Students observe and model ant behavior.

**Materials:** Notepads; pens or pencils; blindfolds; collection of objects to represent ant food (e.g., shoes, balls, books); copy of *Ant Behavior Observation Sheet* for each student or student group

**Activity Time:**  
two 30-minute sessions, or one 50- to 60-minute session

**People Power:** observation teams of three to six; approximately 30 students total

**Setting:** outdoors, indoors

**Conceptual Framework**  
**Topic Reference:** IDIA1, IDIA2

**Terms to Know:** antennae, basic needs, observation, evidence, pheromone

**Appendices:**  
Animals in the Classroom,  
Field Ethics, Simulations, Early  
Childhood Extensions



*Ants are members of a family of insects known for their highly organized social life. Over 11,000 species exist. While most ants live in the tropics, species can be found throughout the world, on every continent except Antarctica.*



Ants consume a variety of foods, yet not all ants eat all foods. Ants can be herbivores, carnivores, or omnivores. Some ant species collect leaves that they use in a way similar to farming. They take the leaves to a nest where a fungus grows on them. The ants harvest the fungus and eat it. Carpenter ants dig elaborate tunnels in wood for shelter, but they do not eat the wood pulp. Most of a carpenter ant's diet consists of aphid secretions. Ants will drink free-standing water, but they get most of their water from their food.

Ants are primarily ground-dwellers, though some species live on trees. Ants can be found in neighborhoods and urban environments. Ant nests can go several feet into the ground and can spread out over several thousand square feet. Ants, like all animals, need water, food, shelter, and space in which to live, all suitably arranged to meet their needs.

Ant communication is essential to life in the colony; however, most ants do not rely on sight or sound. Using their sensitive antennae tips, ants communicate by detecting chemical scents, called pheromones, along with vibrations and other sensory cues. Ants use pheromones to communicate a variety of messages, such as the location of food or the presence of danger. Ants can be observed frequently touching antennae, which can be compared to two students standing in the hallway talking. Ants can often be observed marching in line following each other as they follow these pheromone trails to and from their colony. In most instances, there can be seen a "two-way street" of ants, one army following the pheromone trail out of the colony, while another is following the pheromone trail to return.

## Procedure

1. Before going outside, distribute the *Ant Behavior Observation Sheet* in which students can summarize their observations. At least one student in each group could serve as a recorder, noting the group's observations. Their observations could include the following:

- Evidence of how ants take care of their basic needs;
- Evidence of what their basic needs are; and
- Observations of ant behavior, including how ants move in a line (this is important for a later phase of the activity).

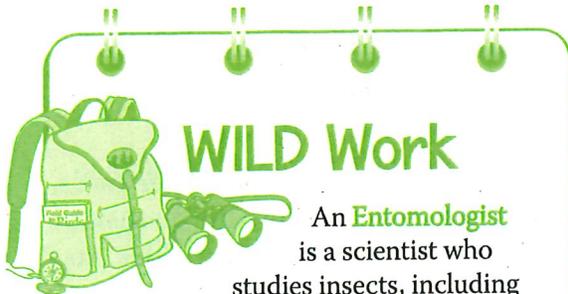
**CAUTION:** Remind students to make their observations without harming the ants or their habitat.

**OPTIONAL:** Before taking students outside, read a short book about ants (e.g., *National Geographic Readers: Ants* by Melissa Stewart) aloud to students to focus their thinking and spark interest on the subject of ants.



2. Take students outside to observe ants. Check sidewalks, near trash cans, and around windows. Look on trees, in flower beds, and in vacant areas. Divide students into groups of three to six, and ask students to observe and record the ants' behavior.
3. Observe the ants for approximately five to ten minutes, depending on the age of the students. Afterwards, bring the groups of students to a central location and ask them to report their findings. Close the discussion with a sharing of descriptions of ant behavior. How do the ants move? Does it appear that the ants "talk" to each other?
4. Move students to a different location, and repeat the observation and recording procedure. Encourage students to note the similarities and differences in the groups of ants and their behaviors. Ask students to comment if the ant movement seems organized or disorganized.
5. Discuss with students their ideas related to ant communication. Brainstorm student ideas on how ants may "talk" to one another. Using the provided background information, discuss ant communication processes and related behaviors.
6. Inform students that they will now model ant communication. Identify boundaries for an established rectangular play space approximately 10' x 20', depending on group size. This rectangular area will represent a twig that the "ants" will walk along. Divide the class in half and instruct each team to stand in a single-file line, with the lines facing opposite directions (representing a "two-way street" of ants). Identify for students the "food" items (e.g., shoes, balls, books) and place them at both ends of the play space. Instruct students that while blindfolded, they will carefully follow their fellow ants down to the other end of the "twig," take turns picking up a food item, and then return using the other "ant lane" to their colony. Ask students to recall how ants travel without running into each other. Have students create a plan using their "antennae" (arms) and other silent acknowledgments to keep each other in line and gathering food. For example, students may put a hand on the shoulder of the "ant" in front of them to make sure they stay in line. When an "ant" encounters a food item, it may tap the hand of the ant behind (the hand resting on its shoulder) to signal the ant behind to stop and wait while the ant in front picks up the food.





## WILD Work

An **Entomologist** is a scientist who studies insects, including how they relate to their environment and other organisms. Over 1 million types of insects have been identified to date, and Entomologists are still discovering new species of insects. Visit [www.projectwild.org](http://www.projectwild.org) to learn more about this occupation.



## In Step with STEM

■ Observe the same group of ants at one location for a semester. Have students modify their data table to include notes about the weather, time of day, and number and behavior of ants observed. Compare data across groups of students or classes making observations at different locations or during different times of the year.

- For older students: Design a flyer or brochure explaining how ants help plants, animals, and people. Research environmentally friendly ways in which ants can be kept out of homes, schools, and other indoor spaces. What are some ways we keep ants from getting into our homes or schools? How do people get rid of ants when they don't want them close by? What ways do you think are best for keeping ants away or for getting rid of ants? Why? Display or otherwise share the finished products with parents and the community.

**OPTIONAL:** Students can close their eyes rather than using blindfolds. Educators may need to monitor the “ants” to make sure they are relying on non-visual communication.

7. Ask students to sit down on the “twig.” After they have investigated the ways that ants meet their basic needs for food, water, shelter, and space in a suitable arrangement, ask students to describe similarities and differences between basic needs of ants and humans. Assist students in generalizing that humans, ants, and other animals—both wild and domesticated—have similar basic needs. Summarize the discussion by noting that, although humans and ants are obviously different, both species share the same basic needs, as do all animal species.

## Extensions

1. For a similar activity for younger children, see the *Growing Up WILD: Exploring Nature with Young Children* activity “Ants on Parade.” You may also visit the “Show Me Wildlife” section of the Growing Up WILD website ([www.pwggrowingupwild.org](http://www.pwggrowingupwild.org)) to find videos and other online resources about ants.
2. Research additional printed and Internet resources for information on ants. Do students want to discover any additional facts about ants? Do the student observations made during the activity match the research? Verify the accuracy of observations and discuss any discrepancies. As a class, watch a fictional movie about ants (e.g., *A Bug's Life* or *Antz*). Compare the behavior observed in the movie to the research and student observations.
3. Investigate the body structure of ants. Students can make ant models from an egg crate (three body parts) and chenille stems (six legs, antennae).
4. Commercial ant farms are available on the Internet and through nature or science supply companies. Establish an ant farm in the classroom for additional observation.
5. Various humane experiments, stressing scientific observation, can be undertaken by the students. For example,
  - Map the space used by an ant colony from the ants' shelter, through their travels, and back to their shelter again. Note where the trail changes surface (grass, concrete) or goes indoors/outdoors, as well as the distance between sources of food, water, and their shelter.
  - Observe how ants find and use water. Provide water in various forms for a colony of ants (e.g., in a dish or in chunks of bread soaked in water). Monitor and record observations.

- Find ants moving in a line. Drop a small piece of food near the line. Record whether the ants will move off the line to obtain food. Repeat this process several times, varying the distance from the ant line to the dropped food.

6. Provide props and have students role-play ants in a colony. Soldiers wear hats and protect the colony; food foragers have bags or water bottles; a queen gives nurse ants “eggs”; and the nurse ants take care of the eggs and young. Cleaning ants (with brooms) and builder ants (with play hammers) may also be included. Rotate student groups to perform the different jobs. Encourage students to draw comparisons between the ant jobs and various human jobs in their community.

## Aquatic Extensions

1. Create a classroom chart comparing the needs of various aquatic animals (e.g., fish, bird, insect) to the needs of humans. Include columns for each of the habitat requirements including food, shelter, water-type, space requirements, etc. Once completed, compare the chart to the students’ completed *Ant Behavior Observations Sheet*. Can they identify patterns that exist for habitat needs among all of the animals?

2. Ants communicate using silent signals, emitting pheromones that other ants smell with their antennae. Ants are not the only animals to rely on scent to find their way to food or return home. Older students can explore the hypothesis that scent plays a major part in salmon’s ability to migrate back to their birthplaces in the *Aquatic WILD K-12 Curriculum and Activity Guide* activity “Sockeye Scents.” For information on acquiring the guide or enrolling in professional development training, visit [www.projectwild.org](http://www.projectwild.org).

3. Many aquatic insects have fascinating means of locomotion. Have students observe an aquatic insect and demonstrate its movement to another student. Ask them to compare this mode of transportation to those of ants and humans.

## Assessment

1. Describe three ant behaviors observed during this activity.
2. For one of these behaviors, describe how this behavior may help or hurt the ant.
3. List four basic needs that humans and ants share.



FOR  
STUDENTS



# Ant Behavior Observation Sheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Search for ants outdoors. Once you locate an ant or a group of ants, observe what they are doing. Make notes, drawings, or both to answer questions about ant behavior below.

What are the basic needs of ants?

How do ants take care of their basic needs?

How do ants move?

